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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,503	09/08/2003	Jaw-Jung Shin	TS02-544	9333
28112	7590	06/02/2006	EXAMINER	
GEORGE O. SAILE & ASSOCIATES 28 DAVIS AVENUE POUGHKEEPSIE, NY 12603			ROSASCO, STEPHEN D	
			ART UNIT	PAPER NUMBER

1756

DATE MAILED: 06/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/657,503

Applicant(s)

SHIN ET AL.

Examiner

Stephen Rosasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/10/03</u> . | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pierrat (6,811,935) or Friedrich et al. (6,635,388) or Yamazoe et al. (2003/0198872) in view of Lee et al. (6,534,221).

The claimed invention is directed to a method of making and using a reticle. The claimed invention is directed to addressing the limitations of the prior art by reducing the number of required phase assignments and being free from possible phase conflicts.

The applicant states that in the prior art phases are assigned to the original elements first, and then the dummy elements added). The latter are then assigned alternating phases. With this scheme, however, a problem can arise in the form of a conflict between the earlier assigned phases and the later assigned phases.

In the claimed invention the objectives are achieved by adding dummy elements at the ends of all rows and columns of the array that is to be imaged, while initially leaving all corners open. Phases are then assigned in checker board fashion to all elements following which additional dummy elements are then placed in the open corners and assigned the same phase as their immediate neighbors.

Pierrat teaches (see claims 1, 21 and 43) a method that includes identifying features for which phase shifting can be applied, automatically mapping the phase shifting regions

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for implementation of such features, resolving phase conflicts which might occur according to a given design rule, and application of sub-resolution assist features within phase shift regions and optical proximity correction features to phase shift regions. In one approach, phase shift regions are laid out so that they extend around corners in a feature, and in one or more identified corners having greater process latitude, the phase shift regions are divided and assigned opposite phases in the corner. In another approach, phase shift regions are laid out so that they do not extend through the corners, and then phase shift regions are merged in all but the identified corners. Both opaque field phase shift masks and complementary binary masks defining interconnect structures and other types of structures that are not defined using phase shifting, necessary for completion of the layout of the layer are produced.

Yamazoe et al. teach a method of making a mask and a mask suitable for an exposure method that uses the mask that arranges a predetermined pattern and an auxiliary pattern smaller than the predetermined pattern, and illuminates the mask using plural kinds of light so as to resolve the predetermined pattern without resolving the auxiliary pattern on a target via a projection optical system, said manufacturing method comprising the steps of: classifying the predetermined pattern into one of a periodic pattern having at least two contact holes arranged in at least one direction among two orthogonal directions, and an isolated pattern that includes no other contact hole arranged in any of the two orthogonal directions; arranging, for the periodic pattern, the auxiliary pattern with an interval as a period between the at least of two contact holes;

and arranging the auxiliary pattern with an arbitrary period for the isolated pattern.

Friedrich et al. teach (see claims and Figs. 1-4) a phase shift mask for use in making contact holes, which has first regions A and second regions B that effect a phase-shift relative to the first regions. The second regions are arranged beside the first regions for producing a sudden phase shift along the boundaries between the first and the second regions. Individual first regions touch one another via corners at points, at which the second regions also touch one another via corners. The result is that the boundaries between first and second regions merge at these points and these points are opaque to the radiation.

Contact holes are formed at the points of intersection of the lines of low radiation intensity.

The teachings of Pierrat or Friedrich et al. or Yamazoe et al. differ from those of the applicant in that the applicant teaches the use of different shapes including rectangles and circles (claims 2, 3, 9, 10, 17, 18, 24, 25, 33, 34) adjusting the phase shift amounts by adjusting the thickness of the phase shift regions.

Lee et al. teach adjusting the phase shift amounts by adjusting the thickness of the phase shift regions.

It would have been obvious to one having ordinary skill in the art to take the teachings of Pierrat or Friedrich et al. or Yamazoe et al. and combine them with the teachings of Lee et al. in order to make the claimed invention because it is well known to adjust phase shifting regions by adjusting the thickness or material composition and contact holes are known to be different shapes including rectangles and circles.

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 39 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Yamazoe et al. (2003/0198872).

Yamazoe et al. teach the mask as claimed.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
5/29/06